User Manuals

Sartorius climate sensors for Sartorius climate station YCM16C

Temperature & Humidity sensor YCM16H
Temperature sensor YCM16T
Pressure sensor YCM16P

98648-019-12

Safety Instructions

- Before operating with or at the device | product, read through the operating instructions.

  This manual contains instructions which should be followed on mounting, start-up, and operation.
  A non-observance might cause:
  – failure of important functions
  – Endangering of persons by electrical or mechanic effect
  – Damages at objects

- Mounting, electrical connection and wiring of the device | product must be carried out only by a qualified technician who is familiar with and observes the engineering regulations, provisions and standards applicable in each case.

- Repairs and maintenance may only be carried out by trained staff or Sartorius Weighing Technology GmbH. Only components and spare parts supplied and | or recommended by Sartorius Weighing Technology GmbH should be used for repairs.

- Electrical devices | products must be mounted and wired only in voltage-free state.

- Sartorius Weighing Technology GmbH guarantees proper functioning of the device | products provided that no modifications have been made to the mechanics, electronics or software, and that the following points are observed:

- All information, warnings and instructions for use included in these operating instructions must be taken into account and observed as this is essential to ensure trouble-free operation and a safe condition of the measuring system | device | product.

- The device | product is designed for a specific application as described in these operating instructions.

- The device | product should be operated with the accessories and consumables supplied and | or recommended by Sartorius Weighing Technology GmbH.

- Recommendation: As it is possible that each measuring system | device | product under certain conditions, and in rare cases, may also output erroneous measuring values, it is recommended to use redundant systems with plausibility checks with security-relevant applications.

Documentation

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- Although this operating instruction has been drawn up with due care, Sartorius Weighing Technology GmbH can accept no liability whatsoever for any technical and typographical errors or omissions in this document that might remain.

- We can accept no liability whatsoever for any losses arising from the information contained in this document.

- Subject to modification in terms of content.

- The device | product should not be passed on without the | these operating instructions.

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1 User manual for temperature & humidity sensor YCM16H

1.1 Model

Order No.	Measuring range	Humidity output	Temperature output	Operating voltage	Sensor-protective filter	Construtions | Connection
YCM16H	0 ... 100 % r. H. –30 ... +100 °C	0 ... 1 V	Pt 100	6 ... 30 V DC	ZE20	Cable gland (Ms), 5 m cable

1.2 Application

The temperature & humidity sensor is designed to measure relative humidity, the air temperature and other non-aggressive gases.

The use of capacitive humidity sensors is a guarantee for:

- a high degree of long-term stability
- nearly linear characteristics
- good dynamic behaviour
- dewing stability
- low temperature coefficients
- low hysteresis

The temperature & humidity sensor includes a Membrane-filter ZE20 for field work. It protects the instrument against dust and wind speeds up to 10 m | s.

1.3 Mounting

For correct measurements, the temperature & humidity sensor should be mounted at a site in the room which is representative of the climate within the room. The mounting position itself is arbitrary. Mount the sensor such that water cannot penetrate the inside of the sensor. Dewing and sprinkling water do not damage the sensor.

Moreover, please make sure to keep the operating voltages as well as a good recirculation ventilation of the instrument. Deviations might lead to measurement errors (for example: due to instrument warming).

Preferably, the sensor should be mounted vertically facing downwards to a wall (indoor application), and should be mounted horizontally facing backwards in canals.

1.4 Maintenance

The temperature & humidity sensor is supplied already calibrated and its characteristics remain stable for years.

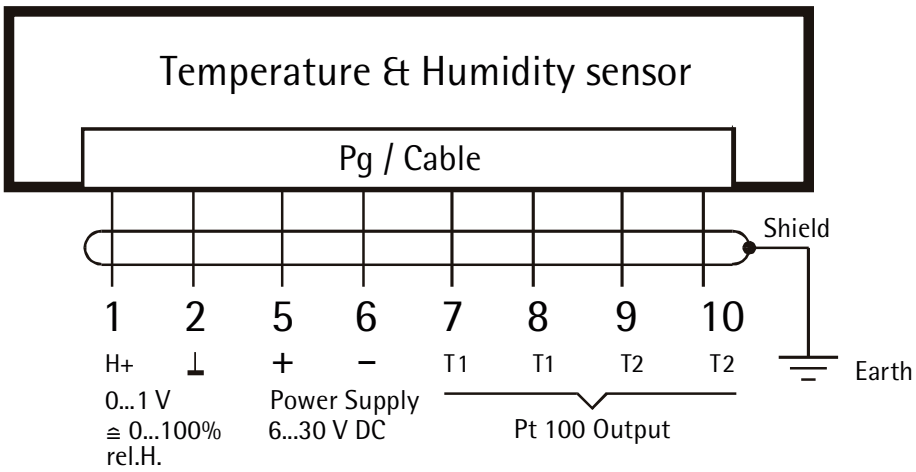
Dust does not damage the humidity sensor but does influence the dynamic behaviour negatively. If the instrument is very dirty, the sensor element can be cleaned or carefully rinsed in distilled water. Make sure you do not touch the highly-sensitive sensor element.

Before cleaning the sensor elements please remove the protecting filter; it should be cleaned, as well or should be replaced.

The instrument housing with the electronics included should be opened only in the factory.

1.5 Connection Diagram

YCM16H



1.6 Technical Data

Humidity	
Measuring element	Capacitive
Measuring range	0 ... 100 % rel. humidity
Accuracy	± 2 % rel. humidity
Uncertainly, DKD (k=2)	± 0.51 % rel. humidity
Long-term stability per year	< 1 % rel. humidity
Repeatability	± 0,50 %

Temperature	
Measuring element	Pt 100 class B, 1/3 DIN tolerance
Measuring range	-40 ... +100 °C
Accuracy at output Pt100, 1/3 DIN	± 0.1 °C
Long-term stability per year	± 0.05 %

Additional Specifications	
Ambient temperature	-40 ... +100 °C
Degree of protection sensor	IP 30
Degree of protection electronics, connecting head	IP 65

Operating voltage	
U-Output (0 ... 1 V)	6 ... 30 V DC

Load resistor	
U-Output (0 ... 1 V)	≥ 2 kΩ

Instrument current requirements	
Humidity (0 ... 1 V)	< 1 mA

Dimension to model YCM16H	
Diameter	20 mm
Shaft length	122 mm
Total length	145 mm
Weight	0.45 kg

2 User manual for temperature sensor YCM16T

2.1 Model

Order No.	Measuring range	Electrical output	Connection
YCM16T	–30 ... +70°C	Pt 100	Cable gland (Ms), 5 m cable

2.2 Application

The temperature sensor with connected cable is designed to measure the air temperature and other non-aggressive gases.

The temperature sensor includes a Membrane-filter ZE20 for field work. It protects the instrument against dust and wind speeds up to 10 m/s.

2.3 Mounting

For correct measurements, the temperature sensor should be mounted at a site of the room which is representative of the climate within the room. The mounting position itself is arbitrary. Mount the sensor such that water cannot penetrate the inside of the sensor. Dew and jets of water do not harm the sensor.

Moreover, you should care for a minimum air flow and the operating voltage to be maintained. Deviations can lead to errors (e.g. due to self-heating) in the measuring values. Preferably, the sensor should be mounted vertically facing downwards to a wall (indoor mounting) and should be mounted horizontally facing backwards in canals. When using the sensor in the open air Weather- and Thermal Radiation Shield is recommended. It reduces to a minimum the possibility of direct radiation or precipitation influencing the data in a negative manner. In addition, it protects the temperature sensor from damaging environmental influences. If the measuring place is badly ventilated, it is recommendable to use a Weather- and Thermal Radiation Shield with force ventilation.

2.4 Maintenance

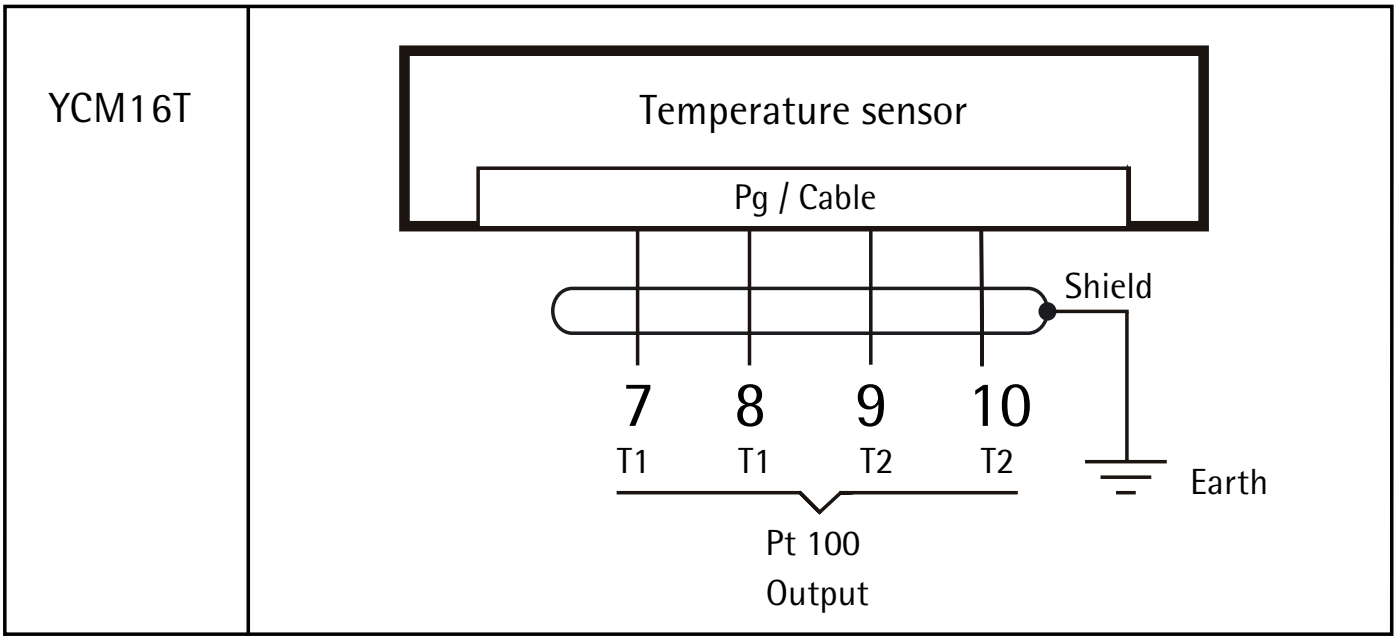
The temperature sensor is supplied already calibrated and its characteristics remain stable for years.

Dust does not damage the Pt100- temperature sensor but does influence the dynamic behaviour negatively. If the instrument is very dirty, the Pt100- temperature sensor can be cleaned or carefully rinsed in distilled water. Make sure you do not touch the highly-sensitive sensor element.

Before cleaning the Pt100-temperature sensor please remove the protecting filter; it should be cleaned, as well.

The instrument housing with the electronics included should be opened only in the factory.

2.5 Connection Diagram



2.6 Technical Data

Temperature	
Measuring element	Pt 100 class B, 1/3 DIN tolerance
Measuring range	–30 ... +70 °C
Accuracy at output Pt 100, 1/3 DIN	± 0.1 °C
Long-term stability per year	± 0.05 %

Additional Specifications	
Ambient temperature	–40 ... +80 °C
Protection Sensor | Electronic	IP 30 | IP 65
Operating voltage	passive
Connection	see model

Dimension to model YCM16T	
Diameter	20 mm
Shaft length	122 mm
Total length	145 mm
Weight	0.35 kg

3 User manual for pressure sensor YCM16P

3.1 Model

Order No.	Measuring range	Output	Operating voltage
YCM16P	800 ... 1060 hPa	0 ... 5 V DC	9.5 ... 28 V DC

3.2 Application | Construction | Mode of operation

The pressure sensor measures the „ABSOLUTE AIR PRESSURE“ of at the location. The pressure sensor is designed for use in environmental applications that require excellent accuracy, fast dynamic response, and long-term stability and reliability.

To withstand the environmental extremes typically found in Automatic Weather Stations, the transmitter housing is made of environmental- and weather-proof materials. The electric connection is carried out via a 5-pole connector with screw-clamp.

The instrument operates in the temperature range form –40° to + 60°C. The analogue output from 0 – 5 V DC can be operated alternatively as 3- or 4-wire-circuit. The voltage supply is within a range from 9,5 – 28 V DC. The current consumption in the measurement mode is 3 mA nominal.

In the pressure sensor a capacitive ceramic-absolute-pressure sensor is used which features excellent thermal and mechanic stability.

3.3 Mechanical Mounting

The pressure sensor is used with air (up to 95% r. h.), and non-conducting gases.

The use with liquids or corrosive gases may damage the instrument!

The pressure sensor is equipped with a 1/8” hose connection, and is typically installed indoors or in weatherproof housing.

The pressure sensor should be installed vertically (connection clamp downwards) to prevent any ingress of condensed water.

3.4 Electrical Mounting

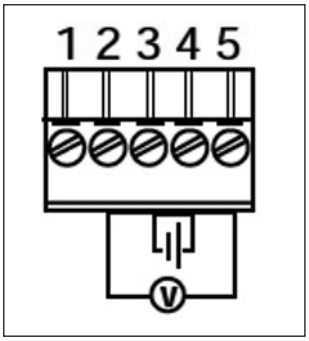


Fig. 1
Four wire connection

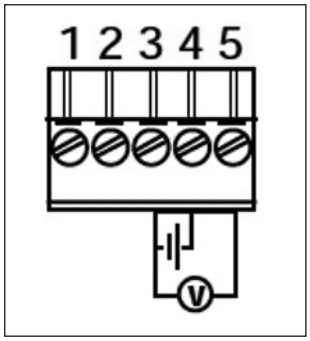


Fig. 2
Three wire connection

Anschlussbelegung der Klemmleiste:

No.	Terminal strip	Function
1	EXT TRIG	no function
2	AGND*	analogue signal ground
3	GND*	supply ground (-)
4	SUPPLY	supply (+)
5	VOUT	output

* Both grounds (AGND and GND) are in the same electrical potential in the pressure sensor.

3.4.1 Connection Options

The ground connections AGND and GNG are in the same electrical potential. The connection is carried out in four- or three-wire-technology (see fig. 1 and 2). Four wire connection is recommended to avoid the voltage drop in the supply ground line, which can affect the accuracy of the pressure measurement. In normal operating mode no connection to the EXT.TRIG terminal is recommended. The pressure sensor is protected against reverse operating voltage.

3.5 Evaluation

The barometric pressure (P) can be calculated from measured output voltage (U) using an equation:

$$P = P_{low} + \frac{P_{range}}{U_{range}} \cdot U_{out}$$

P_{low} Lower limit of the pressure range [hPa]
P_{range} Pressure full range [hPa]
U_{range} Voltage full range [V]
U_{out} Measured output voltage [V]

Example for YCM16P:

Pressure range:	800 ... 1060 hPA
Voltage output:	0 ... 5 V
Measured output voltage:	4 V

$$P = 800\ hPa + \frac{(1060-800)\ hPa}{5\,V} \cdot 4\,V = 1008\ hPa$$

3.6 Maintenance

Maintenance is not required. The pressure sensor is factory calibrated.

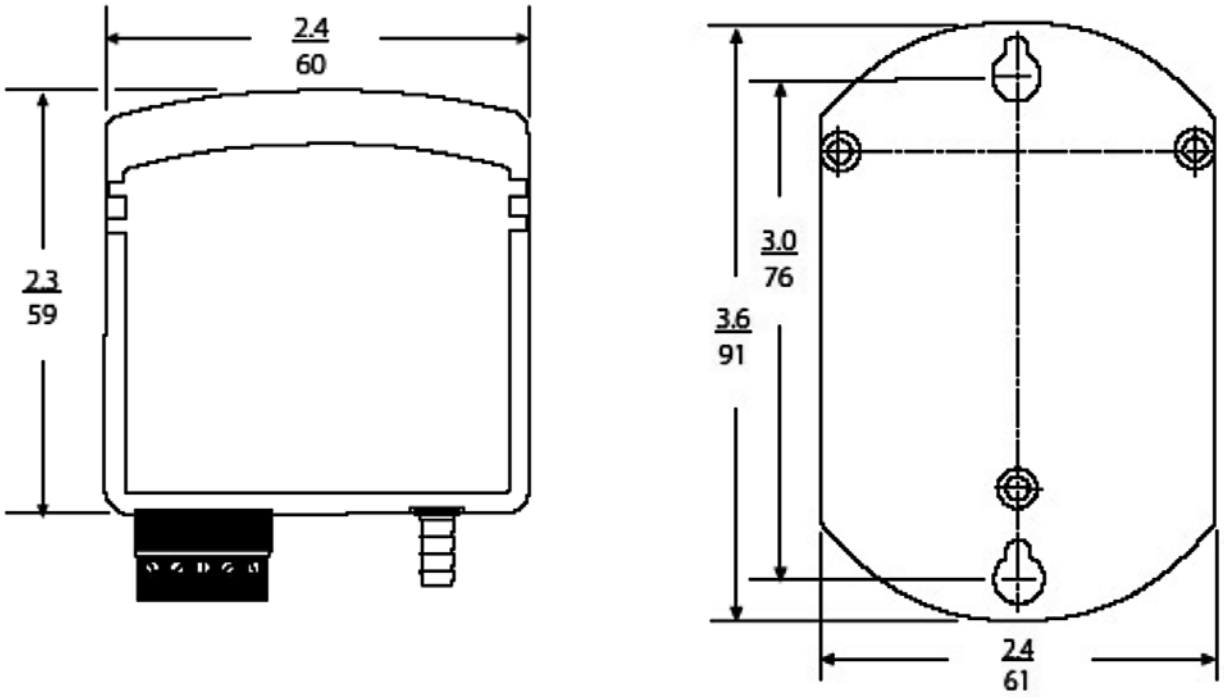
3.7 Technical Data

Pressure	
Measuring element	Capacitive
Measuring range	800 ... 1060 hPa
Accuracy	± 0.3 hPa
Uncertainly, DKD (k=2)	± 0.27 hPa
Long-term stability per year	± 0.1 hPa
Repeatability	± 0.02 hPa

General	
Electrical output	0 ... 5 V DC (0 V saturation voltage = 20 mV)
Operating voltage	9.5 ... 28 V DC
Current consumption	3 mA
Electrical connection	Three- or four-wire technology
Ambient temperature	-40 ... +60 °C
Connection	5 pole terminal strip

Dimensions to model YCM16P	
Dimensions	61 × 91 × 25 mm
Weight	0.14 kg

3.8 Dimensional Drawing (inch | mm)



4 EC-Declaration of Conformity

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CE

EG-Konformitätserklärung
EC Declaration of Conformity

Sartorius Weighing Technology GmbH
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D-37075 Goettingen, Germany

erklärt, dass das Betriebsmittel
declares that the equipment

Präzisionsklimastation für E1 Lab	*High precision climate station for E1 Lab*	YCM16C
Temperaturfühler	*Temperature sensor*	YCM16T
Feuchtefühler	*Humidity sensor*	YCM16H
Drucksensor	*Pressure sensor*	YCM16P

in der von uns in Verkehr gebrachten Ausführung mit den grundlegenden Anforderungen der folgenden Europäischen Richtlinien übereinstimmt:
in the form as delivered complies with the basic requirements of the following European Directives:

Richtlinie 2004/108/EG *Directive 2004/108/EC*	Elektromagnetische Verträglichkeit *Electromagnetic compatibility*
Richtlinie 2006/95/EG *Directive 2006/95/EC*	Elektrische Betriebsmittel zur Verwendung innerhalb bestimmter Spannungsgrenzen *Electrical equipment designed for use within certain voltage limits*

Das Gerät erfüllt die anwendbaren Anforderungen folgender harmonisierten Europäischen Normen.
The apparatus meets the applicable requirements of the harmonized European Standards listed below.

1. Richtlinie 2004/108/EG / *Directive 2004/108/EC*

   EN 61326-1:2006 — Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen - Teil 1: Allgemeine Anforderungen (IEC 61326-1:2005)
   Electrical equipment for measurement, control and laboratory use - EMC requirements – Part 1: General requirements (IEC 61326-1:2005)

2. Richtlinie 2006/95/EG / *Directive 2006/95/EC*

   EN 61010-1:2001 — Sicherheitsbestimmungen für elektrische Mess-, Steuer-, Regel- und Laborgeräte - Teil 1: Allgemeine Anforderungen (IEC 61010-1:2001)
   Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1: General requirements (IEC 61010-1:2001)

Jahr der Anbringung der CE-Kennzeichnung / *Year of attachment of CE marking:* 11

Sartorius Weighing Technology GmbH
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SWT11CE014 YCM16C-58 SOP-3.RD-045-fo2

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Konformitätserklärung
Declaration of Conformity

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erklärt, dass das Betriebsmittel
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Präzisionsklimastation für E1 Lab	*High precision climate station for E1 Lab*	YCM16C
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Drucksensor	*Pressure sensor*	YCM16P

übereinstimmt mit den Regelungen der Europäischen Richtlinie (in der heute gültigen Fassung):
complies with the regulations of the European Directive (in the today valid version):

Richtlinie 2002/95/EG	Zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten
Directive 2002/95/EC	*on the restriction of the use of certain hazardous substances in electrical and electronic equipment*

sofern das Betriebsmittel gekennzeichnet ist mit:
provided that the equipment is marked with:

RoHS EU

Sartorius Weighing Technology GmbH
Goettingen, 2011-00-09

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